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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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ED 067415
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Development of USES Aptitude Test Battery for Book-and-Game-Line Attendant

(print. & pub.) 920.887

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION

Technical Report on Development of USES Aptitude Test Battery

For .....

BOOK-AND-GAME-LINE ATTENDANT (print. & pub.) 920.887

S-400

(Developed in Cooperation with the
Wisconsin State Employment Service)

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November 1967

FOREWORD

The United States Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

Charles E. Odell, Director
U.S. Employment Service

GATB Study #2652

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

Book-and-Game-Line Attendant (print. & pub.) 920.887-052
S-400

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Book-and-Game-Line Attendant (print. & pub.) 920.887. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB, B-1002 Scores
N - Numerical Ability	85
K - Motor Coordination	85
M - Manual Dexterity	85

RESEARCH SUMMARY - VALIDATION SAMPLE

Sample:

59 female applicants for employment as Book-and-Game-Line Attendants in Wisconsin.

Criterion:

Supervisory ratings

Design:

Longitudinal (tests were administered prior to employment and criterion data were collected after training).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, standard deviations, aptitude criterion correlations and selective efficiencies.

Predictive Validity:

Phi Coefficient = .46 ($P/2 < .0005$)

Effectiveness of Norms:

Only 69% of the non-test-selected applicants used for this study were good workers; if the applicants had been test-selected with the above norms 85% would have been good workers. 31% of the non-test-selected applicants used for this study were poor workers; if the applicants had been test-selected with the above norms, only 15% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	69%	85%
Poor Workers	31%	15%

SAMPLE DESCRIPTION

Size:

N = 59

Occupational Status:

Applicants

Work Setting:

Applicants were eventually employed at the Western Publishing Company plant in Racine, Wisconsin

Employer Selection Requirements:

Age: 18+

Education: No requirement

Previous Experience: No requirement

Tests: None used

Other: Interview

Principal Activities:

The job duties for each worker are those shown in the Appendix.

Minimum Experience:

Duties of any station can be learned in a few hours. Several days are required to learn all stations. All employees had at least two weeks on-the-job training at the time the criteria were obtained.

TABLE 2

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age and Education

	Mean	SD	Range	r
Age (years)	23.7	6.6	18 - 41	.010
Education (years)	11.4	1.1	8 - 13	.464**

**Significant at the .01 level

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002 were administered during the period June 1 - October 30, 1961.

CRITERION

The criterion consisted of supervisory ratings of job proficiency made approximately two months after employment. The ratings were made by the immediate supervisor.

Rating Scale:

An adaptation of Form SP-21, "Descriptive Rating Scale" was used. The scale (see Appendix) consists of eight items (seven specific and one over all) covering different aspects of job performance, with five alternatives for each item. The alternatives indicate different degrees of job proficiency.

Reliability:

A significant biserial correlation coefficient of .997 was found between the sum of descriptive rating items A-G and a dichotomy based on item I.

Criterion Score Distribution:

Possible Range:	8 - 40
Actual Range:	14 - 40
Mean:	29.7
Standard Deviation:	6.0

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 31% of the sample in the low criterion group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers." The criterion critical score is 27.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of test and criterion data. Aptitudes K and M which do not have a high correlation with the criterion were considered for inclusion in the norms because the qualitative analysis indicated that they were important for the job duties and the sample had a relatively high mean score on these aptitudes and a relatively low standard deviation on aptitude K. Tables 3, 4, and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performed)

Aptitude	Rationale
Q - Clerical Perception	Necessary to check orders and to select proper items according to orders.
K - Motor Coordination	Necessary in making rapid responses in packing merchandise neatly in carton.
M - Manual Dexterity	Necessary in preparing cartons and in handling merchandise to be packed or to be stacked.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Aptitude	Mean	SD	Range	r
G - General Learning Ability	99.1	15.1	69-131	.292*
V - Verbal Aptitude	98.5	14.6	72-141	.176
N - Numerical Aptitude	101.3	14.7	61-136	.481**
S - Spatial Aptitude	99.1	18.8	65-137	.140
P - Form Perception	107.9	13.8	81-140	.359**
Q - Clerical Perception	112.7	14.6	86-146	.315*
K - Motor Coordination	104.9	13.6	76-140	.049
F - Finger Dexterity	101.1	21.4	65-149	.033
M - Manual Dexterity	104.7	18.4	62-147	.069

*Significant at the .05 level
**Significant at the .01 level

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important						X	X		X
Irrelevant									
Relatively High Mean					X	X	X		X
Relatively Low Standard Dev.		X			X	X	X		
Significant Correlation with Criterion	X		X		X	X			
Aptitudes to be Considered for Trial Norms	G		N		P	Q	K		M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes G, N, P, Q, K, and M at trial cutting scores were able to differentiate between the 69% of the sample considered good workers and the 31% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about one third of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores slightly more than one standard deviation below the mean will eliminate about one-third of the sample; for four-aptitude trial norms, cutting scores slightly less than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of N-85, K-85, M-85 provided optimum differentiation. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .46 (statistically significant at the .0005 level).

TABLE 6

Predictive Validity of Test Norms, N-85, K-85, and M-85

	Nonqualifying Test Scores	Qualifying Test Score	Total
Good Workers	8	33	41
Poor Workers	12	6	18
Total	20	39	59

Phi Coefficient (ϕ) = .46 Chi Square (X^2) = 12.45

Significant Level = $P/2 < .0005$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future grouping of occupations in the development of new occupational aptitude patterns.

WSES-1004

A-P-P-E-N-D-I-X

Form Approved
Budget Bureau No. 44--5907

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score _____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read the sheet "Suggestions to Raters" and then fill in the items listed below. In making your ratings, only one box should be checked for each question.

Name of worker (print) _____
(Last) (First)

Sex: Male _____ Female _____

Company Job Title: _____

How often do you see this worker in a work situation?

- ☐ See him at work all the time.
- ☐ See him at work several times a day.
- ☐ See him at work several times a week.
- ☐ Seldom see him in work situation.

How long have you worked with him?

- ☐ Under one month.
- ☐ One to two months.
- ☐ Three to five months.
- ☐ Six months or more.

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

( ) 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

( ) 2. Capable of low output. Can perform at a slow pace.

( ) 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

( ) 4. Capable of high work output. Can perform at a fast pace.

( ) 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

( ) 1. Very poor. Does work of unsatisfactory grade. Performance is inferior and almost never meets minimum quality standards.

( ) 2. Not too bad, but the grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

( ) 3. Fair. The grade of his work is mediocre. Performance is acceptable but usually not superior in quality.

( ) 4. Good, but the grade of his work is not outstanding. Performance is usually superior in quality.

( ) 5. Very good. Does work of outstanding grade. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

( ) 1. Very inaccurate. Makes very many mistakes. Work needs constant checking.

( ) 2. Inaccurate. Makes frequent mistakes. Work needs more checking than is desirable.

( ) 3. Fairly accurate. Makes mistakes occasionally. Work needs only normal checking.

( ) 4. Accurate. Makes few mistakes. Work seldom needs checking.

( ) 5. Highly accurate. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

- ☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.
- ☐ 2. Has little knowledge. Knows enough to "get by."
- ☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.
- ☐ 4. Has broad knowledge. Knows enough to do good work.
- ☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

- ☐ 1. Very low aptitude. Has great difficulty doing his job. Not at all suited to this kind of work.
- ☐ 2. Low aptitude. Usually has some difficulty doing his job. Not too well suited to this kind of work.
- ☐ 3. Moderate aptitude. Does his job without too much difficulty. Fairly well suited to this kind of work.
- ☐ 4. High aptitude. Usually does his job without difficulty. Well suited to this kind of work.
- ☐ 5. Very high aptitude. Does his job with great ease. Unusually well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

- ☐ 1. A very limited variety. Cannot perform different operations adequately.
- ☐ 2. A small variety. Can perform few different operations efficiently.
- ☐ 3. A moderate variety. Can perform some different operations with reasonable efficiency.
- ☐ 4. A large variety. Can perform several different operations efficiently.
- ☐ 5. An unusually large variety. Can do very many different operations efficiently.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

( ) 1. Very unresourceful. Almost never is able to figure out what to do. Needs help on even minor problems.

( ) 2. Unresourceful. Often has difficulty handling new situations. Needs help on all but simple problems.

( ) 3. Fairly resourceful. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

( ) 4. Resourceful. Usually able to handle new situations. Needs help on only complex problems.

( ) 5. Very resourceful. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. Considering all the factors already rated, and only these factors, how satisfactory is his work? (Worker's "all-round" ability to do his job.)

( ) 1. Definitely unsatisfactory. Would be better off without him. Performance usually not acceptable.

( ) 2. Not completely satisfactory. Of limited value to the organization. Performance somewhat inferior.

( ) 3. Satisfactory. A fairly proficient worker. Performance generally acceptable.

( ) 4. Good. A valuable worker. Performance usually superior.

( ) 5. Outstanding. An unusually competent worker. Performance almost always top notch.

FACT SHEET

Job Title: Book-and-Game-Line Attendant (print. & pub.) 920.887-052

Job Summary: Prepares orders of books and games for shipment, performing duties at various stations.

Work Performed:

Carton Maker: Makes up cartons to be filled by order fillers. Observes shipping copy of order attached to carton prepared by lead girl to note number and color of cartons to be prepared for order fillers. Prepares cartons by folding bottom flaps and pushing them slightly inside the carton to insure against a loose flap slipping under conveyor. Places carton on conveyor, reaching inside carton to flatten flaps against conveyor.

Order Filler, Book: Fills portion of complete order from assigned group of 12 to 18 commodity numbers. Places multi-colored string of beads over edge of lead box to identify order being worked. Removes order from box. Reads order and selects specified quantity of merchandise from pallet line. Packs merchandise neatly in cartons, filling lead carton first. Includes Stock Control Card with each package placed in carton when designated by order. Draws line between commodity number and quantity number on shipping copy of order and initials to note merchandise was packed. Removes beads from lead carton when all order has been filled. Places order in last carton filled. Calls for assistance from Floaters as the situation demands.

May stock merchandise on shelf above conveyor or on pallet line during slack periods if additional space is required.

Line Breaker: Separates all-book orders from book and game orders, checks each page of shipping copy to spot missed pages. Separates order sheets, placing packing list (yellow copy) in lead carton, attaching shipping copy to outside of carton. If lead carton is yellow (all books), presses button which activates switching equipment to route order directly to shipping. Allows book and game orders (blue lead carton) to continue on to gameline.

Packer, Books: Re-packs order to insure all cartons being as full as possible and neatly packed. May make-up smaller cartons to finish order.

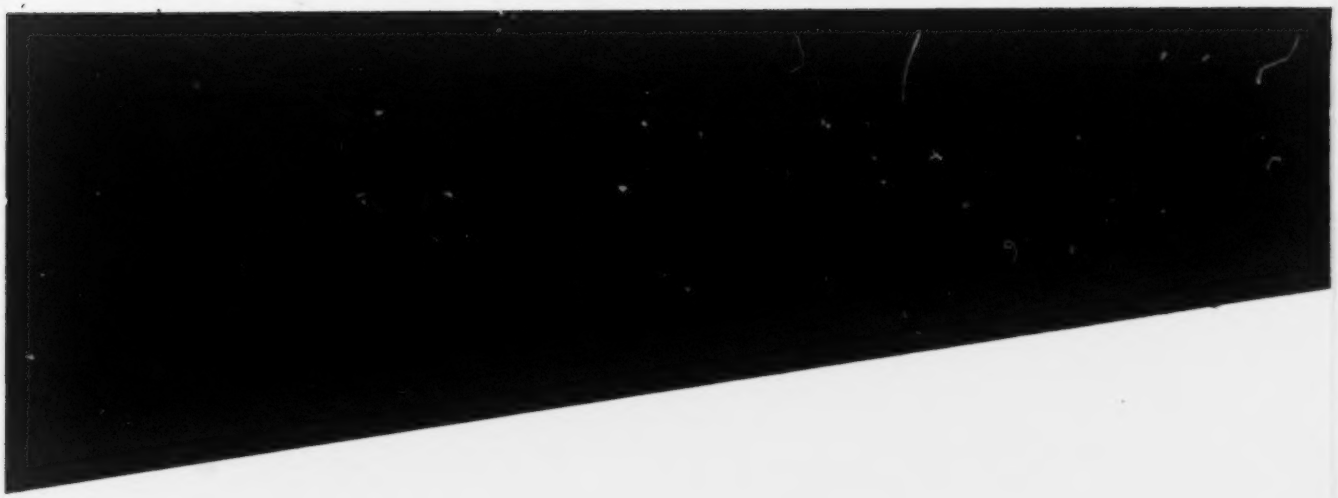
Order Filler, Games: Fills portion of complete order, performing duties identical to order filler, books. Works with sealed cartons rather than paper wrapped packages. Average weight handled, 15-20 lbs.

Effectiveness of Norms: Only 69% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with S-400 norms, 85% would have been good workers. 31% of the non-test-selected

workers used for this study were poor workers; if the workers had been test-selected with S-400 norms, only 15% would have been poor workers.

Applicability of S-400 Norms: The aptitude test battery is applicable to jobs which include a majority of the job duties described above.

GPO 935-812



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